

**WHAT IS CLAIMED IS:**

- 1        1. A method comprising:  
2                providing a coordinator virtual device corresponding to at least a portion of a  
3                        physical data storage device;  
4                detecting when a computer system cluster, including a plurality of nodes, is  
5                        partitioned;  
6                attempting to gain control of the coordinator virtual device; and  
7                removing at least one of the plurality of nodes from the computer system  
8                        cluster when the attempting is unsuccessful.
  
- 1        2. The method of claim 1 wherein the providing a coordinator virtual device  
2                corresponding to at least a portion of a physical data storage device further comprises:  
3                selecting the at least a portion of a physical data storage device;  
4                associating a physical description of the at least a portion of a physical data  
5                        storage device with a coordinator virtual device identifier; and  
6                allowing at least one of the plurality of nodes of the computer cluster to access  
7                        the at least a portion of a physical data storage device via the  
8                        coordinator virtual device identifier.
  
- 1        3. The method of claim 1 wherein the providing a coordinator virtual device  
2                corresponding to at least a portion of a physical data storage device is performed by at  
3                least one virtual device configuration server.
  
- 1        4. The method of claim 3 wherein the at least one virtual device configuration  
2                server is separate from the plurality of nodes of the computer cluster and wherein at  
3                least one of the plurality of nodes of the computer cluster further comprises a virtual  
4                device configuration client.
  
- 1        5. The method of claim 1 further comprising:  
2                reading cluster membership information from the coordinator virtual device  
3                        corresponding to at least a portion of a physical data storage device.
  
- 1        6. The method of claim 1 wherein the detecting when a computer system  
2                cluster, including a plurality of nodes, is partitioned further comprising:

3 reading, as performed by one of the plurality of nodes, cluster membership  
4 information from the coordinator virtual device corresponding to at  
5 least a portion of a physical data storage device; and  
6 determining whether the cluster membership information indicates that the one  
7 of the plurality of nodes is a current member of the computer system  
8 cluster.

1 7. The method of claim 1 further comprising:  
2 writing cluster membership information to the coordinator virtual device  
3 corresponding to at least a portion of a physical data storage device.

1 8. The method of claim 1 wherein the coordinator virtual device  
2 corresponding to at least a portion of a physical data storage device further comprises  
3 cluster membership information.

1 9. The method of claim 1 wherein the coordinator virtual device  
2 corresponding to at least a portion of a physical data storage device is a coordinator  
3 volume.

1 10. The method of claim 1 wherein the detecting when a computer system  
2 cluster, including a plurality of nodes, is partitioned further comprises:  
3 monitoring a network coupled to each of the plurality of nodes for a heartbeat  
4 signal; and  
5 determining when the heartbeat signal is not present for a specified period of  
6 time.

1 11. The method of claim 1 further comprising:  
2 retaining the at least one of the plurality of nodes in the computer system  
3 cluster when the attempting is successful.

1 12. The method of claim 1 encoded in a computer readable medium as  
2 instructions executable on a processor, the computer readable medium being one of an  
3 electronic storage medium, a magnetic storage medium, an optical storage medium,  
4 and a communications medium conveying signals encoding the instructions.

1 13. The method of claim 1 further comprising:

2       allowing at least one of the plurality of nodes of the computer cluster to  
3            exclusively access the at least a portion of a physical data storage  
4            device.

1       14. The method of claim 1 further comprising:  
2            obtaining exclusive access to the at least a portion of a physical data storage  
3            device.

1       15. A system comprising:  
2            a first data storage device;  
3            a virtual device configuration server coupled to the first storage device and  
4            including a first memory and a first processor configured to provide a  
5            coordinator virtual device corresponding to at least a portion of the  
6            first data storage device;  
7            a plurality of virtual device configuration clients configured as a computer  
8            system cluster, at least one of the plurality of virtual device  
9            configuration clients including a second memory and a second  
10           processor configured to:  
11            detect when the computer system cluster is partitioned;  
12            attempt to gain control of the coordinator virtual device corresponding  
13            to at least a portion of the first data storage device; and  
14            remove the at least one of the plurality of virtual device configuration  
15            clients from the computer system cluster when the attempt to  
16            gain control of the coordinator virtual device is unsuccessful.

1       16. The system of claim 15 wherein virtual device configuration server is  
2            further configured to:  
3            select the at least a portion of the first data storage device;  
4            store a coordinator virtual device identifier associated with a physical  
5            description of the at least a portion of the first data storage device; and  
6            allow the at least one of the plurality of virtual device configuration clients to  
7            access the at least a portion of the first data storage device via the  
8            coordinator virtual device identifier.

1        17. The system of claim 15 wherein the first data storage device is at least one  
2 of a disk drive, a JBOD, a disk array, and an integrated circuit.

1        18. The system of claim 15 wherein the first data storage device is coupled to  
2 the virtual device configuration server via a network.

1        19. The system of claim 15 wherein the virtual device configuration server is  
2 a volume server, wherein the coordinator virtual device is a coordinator volume, and  
3 the plurality of virtual device configuration clients is a plurality of volume clients.

1        20. The system of claim 15 wherein the at least one of the plurality of virtual  
2 device configuration clients is further configured to read cluster membership  
3 information from the coordinator virtual device corresponding to at least a portion of  
4 the first data storage device.

1        21. The system of claim 20 wherein the at least one of the plurality of virtual  
2 device configuration clients is further configured to determine whether the cluster  
3 membership information indicates that the at least one of the plurality of virtual  
4 device configuration clients is a current member of the computer system cluster.

1        22. The system of claim 15 wherein the at least one of the plurality of virtual  
2 device configuration clients is further configured to write cluster membership  
3 information to the coordinator virtual device corresponding to at least a portion of the  
4 first data storage device.

1        23. The system of claim 15 wherein the coordinator virtual device  
2 corresponding to at least a portion of the first data storage device further comprises  
3 cluster membership information.

1        24. The system of claim 15 wherein the at least one of the plurality of virtual  
2 device configuration clients is further configured to retain the at least one of the  
3 plurality of virtual device configuration clients in the computer system cluster when  
4 the attempt to gain control of the coordinator virtual device is successful.

1        25. The system of claim 15 wherein the first memory and the virtual device  
2 configuration server belong to at least one of a host computer system, a cluster node, a  
3 storage appliance, a network appliance, and a storage area network (SAN) switch.

1        26. The system of claim 15 wherein the at least one of the plurality of virtual  
2 device configuration clients is further configured to obtain exclusive access to the  
3 coordinator virtual device.

1        27. The system of claim 15 wherein the virtual device configuration server is  
2 further configured to allow exclusive access to the coordinator virtual device by the at  
3 least one of the plurality of virtual device configuration clients.

1        28. An apparatus comprising:  
2            a means for providing a coordinator virtual device corresponding to at least a  
3                portion of a physical data storage device;  
4            a means detecting when a computer system cluster, including a plurality of  
5                nodes, is partitioned;  
6            a means for attempting to gain control of the coordinator virtual device; and  
7            a means for removing at least one of the plurality of nodes from the computer  
8                system cluster when the attempting is unsuccessful.

1        29. The apparatus of claim 28 further comprising:  
2            a means for reading cluster membership information from the coordinator  
3                virtual device corresponding to at least a portion of a physical data  
4                storage device.

1        30. The apparatus of claim 28 further comprising:  
2            a means for writing cluster membership information to the coordinator virtual  
3                device corresponding to at least a portion of a physical data storage  
4                device.

1        31. The apparatus of claim 28 further comprising:  
2            a means for determining whether cluster membership information stored in the  
3                coordinator virtual device corresponding to at least a portion of a

4 physical data storage device indicates that the one of the plurality of  
5 nodes is a current member of the computer system cluster.